Safety and Health Case Summaries
Enforcement Workshop, March 2012

1. Unescorted Entry into Active Laser Area

A Facilities electrician received a work order from his work lead to install a switch box and a power cord on a vacuum pump in a Class 4 laser room. He arrived escorted by a laser lab scientist to review the scope of work. After reviewing the work to be performed and inspecting the equipment, the electrician alerted the laser lab scientist that he needed additional tools and materials to complete the task. The scientist informed the electrician that he should not work in a laser lab without an escort. The electrician then informed his work lead that he needed to re-schedule the job. The work lead did not discuss or address the work area hazards and controls with the electrician. The electrician had limited experience entering active laser areas.

The electrician returned to the lab at a later date to complete the job. He did not notice if the laser light was on before entering the room upon his arrival. The electrician did not read the door signs. Reportedly, the laser was shuttered. To access the room, the electrician used the code he had acquired by observing the numbers being entered when he was escorted by the scientist earlier. The electrician had used the same code previously when working in an inactive laser lab. He donned his laser safety goggles, and placed the tools and materials inside the room.

The electrician then left the laser room to obtain approval from lab personnel to perform the work in the room. He returned and was let into the lab room by ringing a bell. The electrician proceeded to work on the pump and found some difficulty with the installation of the magnetic starter. He then sought assistance from a coworker. Both the electrician and the coworker were wearing laser eye protection at the time. During trouble-shooting, the laser lab scientist came to the lab room, and questioned the work experience of the electrician. After the electrician left, the scientist communicated his concern to Facilities line management about the electrician entering the laser room that morning without an escort.

The electrician stated that hazards and controls related to Class 4 lasers had not been covered in any of his safety training or in his pre-job orientation with the laser lab scientist. There was no documented guidance for performing a laser area pre-job orientation. Additionally, the job hazard analysis for the electrician work group did not mention hazards and controls for accessing laser lab areas and performing work around active lasers.

ORPS Reporting

Significance Category: 3

Reporting Criterion: 10(3) - "*A near miss to an otherwise ORPS reportable event, where something physically happened that was unexpected or unintended, or where no or only one barrier prevented an event from having a reportable consequence. The significance category assigned to the near miss must be based on an evaluation of the potential risks and extent of personnel exposure to the hazard."*

What are the potential noncompliances?
Does this event meet the NTS reporting threshold?

2. Lab Oven Explosion During Energetic Material Deactivation

Small explosive devices detonated in a bench top laboratory oven blowing the oven door and insulation off and bulging the oven sides. The door landed approximately five feet away and scattered debris around the room.

Two technicians had been performing an established process for deactivating small explosive devices in preparation for disposal. The procedure followed by the technicians was originally established for Squibs (electrical initiators) and Squib valves, and did specifically address deactivation of other devices. The deactivation process used a small desk top laboratory oven placed within a ventilation hood located within a test cell room. Deactivation by heating was a secondary process when electrical deactivation could not be done.

The technicians placed 273 devices, each containing 22 to 105 milligrams of energetic material in a four and one-half inch by one inch stainless steel dish, which was placed into the oven. The devices included 69 pellets of pentaerythritol tetranitrate (PETN) explosive devices and 200 pieces of lead syphnate. The PETN pellets were not individually contained. The devices were believed to be nonpropagating. During the heating process the oven room was unoccupied and monitored by using a closed circuit camera.

The oven was activated to heat to 1000 degrees Fahrenheit. The technicians then left the test cell area and secured the door. Thirty minutes later, an engineer sitting outside the oven room area heard a loud bang. One of the technicians returned to the adjacent area moments later. The engineer and technician looked at the video monitor and discovered that a detonation had occurred. The initiation caused the oven to over pressurize, and its door to separate landing approximately five feet away.

The technician secured the oven room area and notified departmental management. There were no injuries. The laboratory oven was destroyed. The contractor stated that the process was not evaluated for incompatibility since products to be incinerated were evaluated to be non mass detonating.

ORPS Reporting

Significance Category: 3

Reporting Criterion: 10(3) - "*A near miss to an otherwise ORPS reportable event, where something physically happened that was unexpected or unintended, or where no or only one barrier prevented an event from having a reportable consequence. The significance category assigned to the near miss must be based on an evaluation of the potential risks and extent of personnel exposure to the hazard."*

What are the potential noncompliances?

Does this event meet the NTS reporting threshold?

3. Contractor Occupational Medicine Program

A prime contractor subcontracts the majority of its construction and demolition work to other companies that provide subcontracted workers who are on-site for 30 days or more. The prime provides on-site occupational medical support solely to its own workers. The subcontractor companies provide lists of off-site occupational medical providers to their workers, who then take a generic one page fitness for duty statement to the provider of their choice to complete the physicals.

The off-site occupational physicians who see the subcontractor workers generally have had no further communication with the subcontractor or prime. The off-site physicians typically are neither aware of 10 CFR 851 or its related provisions, nor have familiarity with the worksite. There is no established mechanism for activity-specific hazard information to be communicated between the physicians and the subcontractor company. Subcontract workers are not always offered a general health evaluation upon separation to establish a physical condition of record.

The prime contractor performs industrial hygiene (IH) exposure assessment monitoring for all workers (including subcontracted workers). Individual results are given directly to the contractor and subcontractor workers as required. Copies of the exposure assessments for the contractor employees are sent to their on-site occupational physician. Copies of the exposure assessment for subcontracted workers are kept in the IH records.

What are the potential noncompliances?

Does this event meet the NTS reporting threshold?

4. Contractor LASER Near Miss

A graduate student (qualified laser operator) began work for the day with a Ti:Sapphire laser in a research lab. The student placed an object on an optical table and observed an exposed laser beam on his shirt sleeve. The student was not wearing laser eye protection because the laser was supposed to be in what was called "Class I mode" where all beams are enclosed and inaccessible. Class I mode on this laser was achieved by the use of a safety shutter and two enclosure panels. The panels were absent when the student entered the lab but he did not immediately realize this was inconsistent with Class I mode operations.

When the student saw the beam on his sleeve he recognized that something was wrong. The student tracked down the source of the beam and placed a beam block at the exit of the laser to eliminate the hazard. He then left the lab and contacted his supervisor.

The investigation revealed that three laser operators were performing work with this laser the day before. Two of the three had only recently started at the lab. The group determined that an optical component needed to be repositioned which necessitated the removal of the laser safety shutter. This step was outside the original scope of work. Additionally, the safety system change (i.e. shutter removal) required prior supervisor approval. The group sought neither the required approval for the work scope change, nor the safety system reconfiguration.

At the end of work, the laser remained with the safety shutter removed. However, the unit was inappropriately placed in the Class I mode. This mode was common lab practice for COB. No one recalls who in the group actually placed the Class I mode status. No one verified that the Class I mode was appropriate for the configuration in which the laser was actually left at day's end.

ORPS Reporting

Significance Category: 3

Reporting Criterion: 10(3) - "*A near miss to an otherwise ORPS reportable event, where something physically happened that was unexpected or unintended, or where no or only one barrier prevented an event from having a reportable consequence. The significance category assigned to the near miss must be based on an evaluation of the potential risks and extent of personnel exposure to the hazard."*

What are the potential noncompliances?

Does this event meet the NTS reporting threshold?

5. Subcontractor Working from Heights without Fall Protection

Three subcontractor employees were performing maintenance work on a scrubber that was difficult to access and surrounded by Unistrut. Worker #1 was torqueing flanges from the floor level. Worker #2 reached flanges at the upper levels by standing on a horizontal Unistrut beam 7 feet, 4 inches above the floor. Worker #3 was handing tools to Worker #2 and serving as a fall protection "spotter". A DOE representative came upon the scene and questioned the lack of fall protection. The condition was brought to the attention of the prime contractor who stopped the work.

An investigation found that the prime contractor's S&H program (to which the subcontractor was supposed to adhere) required 100% fall protection when working about 6 feet. The fall protection requirement was also reflected in the activity hazard analysis (AHA) to which the subcontractor worked.

The subcontractor employees reported they had done the work many times previously in the same manner. The workers recognized the fall hazard and were aware of the requirements contained in the AHA. In fact, they had discussed the requirements numerous times. However, the workers believed the use of fall protection presented a greater hazard than just climbing on the Unistrut to access the flanges and relying on a "spotter". Their discussions/decision was never documented or conveyed to the prime contractor. The AHA or site fall protection plan was never reviewed or modified as a result of the concerns.

ORPS Reporting

Significance Category: 3

Reporting Criterion: 10(2) - "*An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex. The significance category assigned to the management concern should be based on an evaluation of the potential risks and impact on safe operations."*

What are the potential noncompliances?

Does this event meet the NTS reporting threshold?

6. Contractor Beryllium Program

On July 1, 2010 while preparing Building Z387 for cold and dark status a health physics technician discovered some machining bar stock in an abandoned shower stall that had been converted into a storage area. The health physics technician surveyed the pieces of bar stock and determined there was no radioactive contamination. The health physics technician notified production personnel and they relocated the bar stock to an adjacent office. It was staged in this office for 4 weeks until a production technician called an industrial hygienist for assistance on how to dispose of it. The industrial hygiene department took custody of the bar stock and proceeded to make a determination of its composition. Laboratory analyses of wet wipe samples taken from the surface of the bar stock revealed it was a copper beryllium alloy. Follow up surveys at each location the bar stock had been stored revealed beryllium contamination levels above 0.2 ug/100 cm2. Twenty-five employees had contact with work surfaces and areas where this material had been stored prior to the industrial hygienist taking custody.

On August 23, 2010 an industrial hygiene technician took 50 surface swipe samples to evaluate metal contamination in a glovebox hood in Building Z387. The samples were scanned for the presence of multiple metals. Upon receipt of the sample results it was discovered that beryllium was present on 25 of the samples. A second round of surface swipes were taken. The sample results for the swipes indicated 45 samples (75 percent of the swipes) exceeded 0.2 ug/100 cm2. The glovebox hood had never been identified by the contractor as an area where beryllium storage or work had occurred.

On September 1, 2010 a quality assurance auditor was auditing a medical database and selected the records for 15 employees from Building Z387 to review. A review of the employee medical records revealed that medical personnel had entered an incorrect code on a work approval form indicating all 15 employees had restrictions from working in a Beryllium Work Area. This discrepancy had existed for at least 6 months. Each of these employees had been routinely working in a Beryllium Work Area even though their medical records indicated they had work restrictions.

10 CFR 850 Specific Program Requirements
[Baseline beryllium inventory, hazard assessment, regulatory limits, exposure monitoring, exposure reduction and minimization, regulated areas, hygiene facilities and practices, respiratory protection, protective clothing and equipment, housekeeping, release criteria, waste disposal, beryllium emergencies, medical surveillance, medical removal, medical consent, training and counseling, warning signs and labels, recordkeeping and use of information, and performance feedback]

Regulatory limits:
Action level - 0.2 ug/m3 8-hour TWA
Contamination levels: Beryllium work area - 3 ug/100 cm2; release criteria - 0.2 ug/100 cm2

Event 1

ORPS Reporting

Significance Category: 3

Reporting Criterion: 10(2) - Management Concerns/Issues - "*An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex. The significance category assigned to the management concern should be based on an evaluation of the potential risks and impact on safe operations."*

Event 2

ORPS Reporting:

Significance Category: 3

Reporting Criterion: 10(2) - Management Concerns/Issues - "*An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex."*

Event 3

ORPS Reporting

Significance Category: 4

Reporting Criterion: 10(2) - Management Concerns/Issues - "*An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex."*

What are the potential noncompliances?

Do these events individually or collectively event meet the NTS reporting threshold?

7. Subcontractor Respirator Use

On June 13, 2011 a subcontractor self-reported to the site prime contractor that one of their employees had used the wrong cartridge for an air purifying respirator (APR) during mercury decontamination activities. This issue was identified during a routine safety walkthrough by the prime contractor's Industrial Hygienist. Respirator issuance was the responsibility of the prime contractor. Personal air sampling performed for the employee on the day this occurred revealed the employee had exceeded the 8-hour TWA TLV for inorganic mercury (sample result - 0.05 mg/m3). During the investigation of the event the employee acknowledged that when he took the respirator out of its storage bag he noticed that the cartridge did not look the same as the one he had used to perform his work earlier in the week. He donned the respirator and began work. The employee stated that the respirator was not returned to the issue station since historical air sampling data had always indicated airborne mercury levels to be non-detectable and he felt pressured to get to work.

Note: According to the contract for this work the subcontractor is required to follow the prime contractor's 10 CFR 851 Worker Safety and Health Program.

Note: Inorganic mercury has an 8-hour TWA TLV of 0.025 mg/m3

ORPS Reporting

Significance Category: 4

Reporting Criterion: 2(B)(6) - Occupational Exposure - *"Personnel exposure to chemical, biological or physical hazards (e.g. noise, laser, ultraviolet light, heat, etc) above limits established in 10 CFR Part 851, but below levels deemed immediately dangerous to life and health (IDLH)."*

What are the potential noncompliances?

Does this event meet the NTS reporting threshold?

8. Employees Sprayed with Hydrochloric Acid

On July 15, 2010 two maintenance employees were dispatched to an acid station to tighten a clamp on an acid pump line. The job was considered as pre-approved dispatched work which did not require an AJHA. Personal protective equipment selected for this work was based on other activities that were performed at the acid station. (coveralls, neoprene gloves, apron, chemical safety goggles, face shield) Application of a lockout/tag-out (LO/TO) was executed to isolate power to the pump. After application of the LO/TO the employees confirmed that the pump was de-energized. No confirmation was made by the employees that the lines leading to and away from the clamp had been drained of hydrochloric acid. The employees began to tighten the clamp connection when the clamp broke and approximately 1 gallon of hydrochloric acid that collected in a vertical section of the acid line was released. The two employees were exposed to acid vapor in the immediate area of the spill for at least 15 minutes. The acid splattered onto the workers' protective clothing that was not covered by an apron. After rinsing off under the safety shower and removing their PPE they immediately called for assistance and were transported to the site's medical facility, and ultimately to the hospital. After the medical reports were received detailing the medical treatment it was identified that treatment provided by the hospital emergency staff involved more than more than first aid.

A similar event had occurred at the site in 2004 in the same building and involving the same work group. In the 2004 event two maintenance employees attempted to tighten a clamp on an acid pump assembly. The clamp failed due to a broken bolt and acid sprayed onto a maintenance employee. In this case the employees did not believe a LOTO was necessary for the work and isolation of the system was never confirmed by the issuing authority.

Two other DOE sites had issued ORPS reports describing similar events 6 months prior to the most recent incident.

Note: Hydrochloric acid has a TLV-C of 2 ppm.

ORPS Reporting

Significance Category: 3

Reporting Criterion: 2(B)(4) - Occupational Exposure - "*Personnel exposure to chemical, biological or physical hazards (e.g. noise, laser, ultraviolet light, heat, etc.) above limits established in 10 CFR Part 851, but below levels deemed immediately dangerous to life and health (IDLH), and requires the administration of medical treatment beyond first aid on the same day as the exposure.*

What are the potential noncompliances?

Does this event meet the NTS reporting threshold?

Worker Safety and Health Noncompliance Reporting Criteria (as of January 1, 2012)

Worker Safety and Health Noncompliances Associated With Occurrences (DOE Order 232.2)

Consult the DOE Order for the full text of each occurrence criterion[1]

Reporting Criteria Group	Subgroup	Occurrence Category and Summary Description[2]
1. Operational Emergencies[3]	N/A	(1) Operational Emergency (2) Alert (3) Site Area Emergency (4) General Emergency
2. Personnel Safety and Health	A. Occupational Injuries	(1) Fatality/terminal injury (2) Inpatient hospitalization of ≥ 3 personnel (3) Inpatient hospitalization ≥ 5 days (4) ≥ 3 personnel having Days Away, Restricted, or Transferred (DART) cases (5) Serious occupational injury
	B. Occupational Exposure	(1) Fatality/terminal illness or inpatient hospitalization of ≥ 3 personnel (2) Inpatient hospitalization ≥ 5 days or ≥ 3 personnel having DART cases (3) Personnel exposure > 10X limits or > IDLH (4) Personnel exposure > limits but < IDLH requiring medical treatment (5) Exposure resulting in serious occupational injury (6) Personnel exposure > limits but < IDLH
	C. Fires	(1) Fire within primary confinement/containment (2) Fire in a nuclear facility (3) Fire in a non-nuclear facility
	D. Explosions	(1) Unplanned explosion within primary confinement/containment (2) Unplanned explosion in a nuclear facility (3) Unplanned explosion in a non-nuclear facility
	E. Hazardous Electrical Energy Control	(1) Unexpected/unintended personal contact (2) Unexpected discovery of uncontrolled energy source
	F. Hazardous Energy Control (other than electrical)	(1) Unexpected/unintended personal contact (2) Unexpected discovery of uncontrolled energy source
4. Facility Status	B. Operations	(1) Stop Work Order from DOE
10. Management Concerns/Issues	N/A	(1) Initiation of a Federal Accident Investigation (3) Near miss

Other NTS Worker Safety and Health Reportable Conditions

Reporting Threshold	Notes[4]
Severity Level I noncompliance(s) with Parts 851 or 850 (Refer to Part 851, Appendix B, Section VI(b)(1))[5]	Conditions of noncompliance identified by any method or means (e.g., assessments, inspections, observations, employee concerns, event evaluation) that represent a condition or hazard that has the potential to cause death or serious physical harm (injury or illness). These conditions include imminent danger situations.
Programmatic deficiencies involving noncompliances	A programmatic problem generally involves some weakness in administrative or management controls, or their implementation, to such a degree that a broader management or process control problem exists and requires broad corrective actions.
Repetitive noncompliances	Two or more different events/conditions that involve substantially similar work activities, locations, equipment, or individuals.
Intentional violation or misrepresentation	Also known as willful noncompliance; may involve record falsification.
Substantiated management reprisal(s) against worker(s) for raising safety issues associated with 851.20(a)(6) or (9)	Customarily referred to as worker retaliation.

Notes to Tables

1 The simple occurrence of an event or discovery of a condition in any of the listed categories is not by itself sufficient to warrant NTS reporting. NTS reporting requires the identification of a 10 C.F.R. Part 850 or 851 noncompliance in conjunction with the event or discovery. Contractors identifying a significant worker safety and health noncompliance in association with an event/discovery type or category not listed on the table should evaluate the event for NTS reportability, particularly under the "Severity Level I Noncompliances" category.

2 These summary descriptions are a brief characterization of the related criteria. Use the full statement of the criteria contained in DOE Order 232.2 to determine NTS reportability of event-related worker safety and health noncompliances.

3 Report worker safety and health noncompliances associated with any of the DOE Order 232.2 Operational Emergency categories (Operational Emergency, Alert, Site Area Emergency, General Emergency).

4 Refer to Chapter IV of the Enforcement Process Overview for more information about these types of noncompliances.

5 Conditions of noncompliance identified by any method or means (e.g., assessments, inspections, observations, employee concerns, event evaluation) that would not otherwise be reported into NTS as either a Management Issue or Occurrence, but that represent a condition or hazard that has the potential to cause death or serious physical harm (injury or illness). These conditions include imminent danger situations.